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(71) Applicant *(for all designated States except US)*: VIROLA, Patria, Aguilar [AU/AU]; 17 Strathmore Road, Caves Beach, NSW 2281 (AU).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)* : WARLAND, John, Richard [AU/AU]; 17 Strathmore Road, Caves Beach, NSW 2281 (AU).

(74) Agent: WATERMARK; Suite 6, Floor 16, Town Hall House, 456 Kent Street, Sydney, NSW 2000 (AU).

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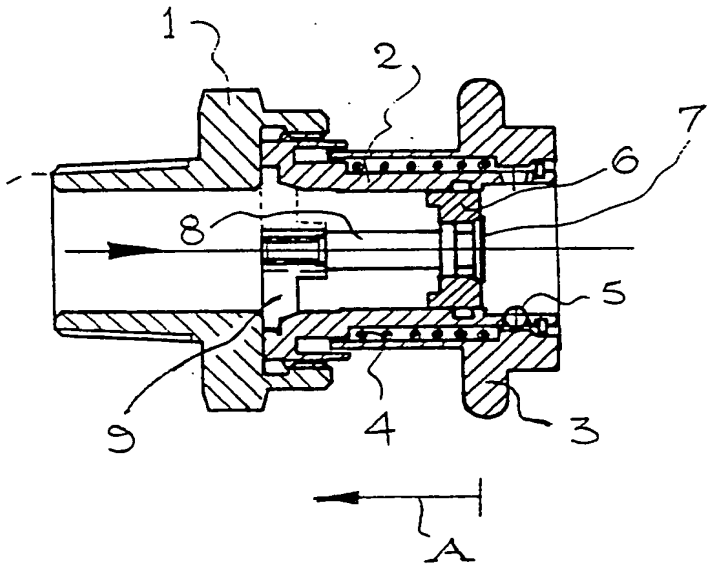
(54) Title: FILLING NOZZLE AND RECEIVER THEREFOR



(57) Abstract

A combination of a filling nozzle and an "in tank" receiver, particularly for supplying a vehicle with such as coolant, crankcase oil, hydraulic fluids and the like. When the nozzle is "mated" with the receiver, a spring-loaded annulus (6) in the nozzle is pushed back by the "muzzle" (12) of the receiver; at the same time, a valve body (11) in the receiver is pushed back by a disc (7) on a stem (8), rigidly positioned in the nozzle. Thus, a passage is created to permit fluid delivery. The two elements are held together by ball-bearings (5), which engage in a groove (17). When the two elements are disconnected, the annulus (6) sealingly surrounds the disc (7), to close off the nozzle, while the valve body (11) returns to close off the receiver mouth.

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FILLING NOZZLE AND RECEIVER THEREFOR

TECHNICAL FIELD

This invention relates to filling means or liquid transfer apparatus and more particularly to a filling nozzle in combination with a co-acting, automatic shut-off receiver.

BACKGROUND ART

While it is known to refuel motor vehicles with refuelling apparatus such as those described and claimed in the specifications relating to U.S. Patents Nos. 3,662,793 and 3,674,061, and more recently in that relating to Australian Patent Application No. 71482/87, it is still the norm to supply coolant, transmission and hydraulic fluids, and crankcase oil from hand-held containers. Since the spout of the container is not connected to the inlet part of the fluid tank or sump in any way, merely being thrust loosely into it, the danger of contamination is considerable.

It is therefore an object of the present invention to overcome the above and other disadvantages by the provision of a filling nozzle in combination with a co-acting, automatic cut-off receiver.

DISCLOSURE OF INVENTION

In accordance with the present invention, the abovementioned object is achieved by the provision of, in combination, a filling nozzle and a co-acting, automatic cut-off receiver; the filling nozzle having, concentrically accommodated therewithin, a spring-loaded annulus which is axially displaceable, in the upstream direction, by a muzzle portion of the automatic cut-off receiver; the automatic cut-off receiver having, concentrically accommodated therewithin, a spring-loaded valve body which is adapted to be axially displaced, in a downstream direction, by a discoid member fixedly mounted with respect to a housing of the filling nozzle, the fixed discoid member being sealingly located, when the combination is in the inoperative condition, in the centre of the axially displaceable spring-loaded annulus; thus, when the combination is in the operative condition with the discoid

member no longer located in the centre of the now-displaced annulus, a passage is defined to thereby communicate the fluid delivery hose, which is attached to the tailpiece of the nozzle, with the interior of the sump, tank or other container in which the automatic cut-off receiver is installed.

The housing is preferably cylindrical and may well be surrounded by an axially-movable, spring-loaded, co-axial annular sleeve, the downstream portion of which is adapted to surround a plurality of radially spaced-apart ball-bearing which are located adjacent the free end of the filling nozzle when the sleeve is in its relaxed mode, the receiver being provided with a circumferential groove in its outer wall in which groove the ball-bearings are able to engage when the combination of filling nozzle and receiver is in the operative condition; whereby the filling nozzle is able to be lockingly held in the co-acting, automatic cut-off receiver while the sump, tank or other container is being filled. When filling has been accomplished, the sleeve can be moved manually in the upstream direction, against the biasing force of a helical compression spring, to thus free the ball-bearings from the circumferential groove so that the filling nozzle can be removed from the automatic cut-off receiver.

Advantageously, the valve body is provided with a co-axial valve stem which is adapted to be received in a tubular element, or sleeve, which is rigidly affixed in position within the automatic cut-off receiver by means of a three-limbed, or triskellion, spider member.

Ideally, the discoid member is fixedly mounted upon a stem member which is held rigidly in position within the filling nozzle, also by means of a three-limbed, or triskellion spider and, when the filling has been completed and the annular sleeve manually moved in the upstream direction, the ball-bearings are caused to ride up over a circumferential bead provided on the outer wall upstream of the circumferential groove, to thereby break the connection between the filling nozzle and the co-acting, automatic cut-off receiver.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the reader may gain a better understanding of the present invention, hereinafter is described a preferred embodiment thereof, by way of example only and with reference to the accompanying drawings, in which:-

Figure 1 is a vertical cross-section through a filling nozzle according to the present invention, in the inoperative or relaxed condition;

Figure 2 is a vertical cross-section through an automatic shut-off receiver, in the inoperative, closed or relaxed condition; and

Figure 3 is a vertical cross-section through the nozzle and receiver in their mated, open, or operative condition.

Throughout the drawings, like integers are referenced by the same numeral.

BEST MODE FOR CARRYING OUT THE INVENTION

Figure 1 shows, in vertical cross-section, an inventive filling nozzle which includes a tailpiece 1 adapted to have connected thereto a fluid delivery hose or conduit to deliver to the nozzle a supply of coolant, transmission or hydraulic fluids, or of, say, crankcase oil - not containerized but in bulk. Tailpiece 1 is screwed onto the filling nozzle proper which is comprised of a cylindrical housing 2 which is surrounded, or encompassed, by an axially movable, co-axial annular sleeve 3. Sleeve 3 is spring-urged by a helical compression spring 4 a downstream portion of which is adapted to surround a plurality of radially spaced-apart ball-bearings, as referenced 5, perhaps 8 in number, located adjacent the free, or muzzle, end of housing 2.

Housing 2 of the inventive filling nozzle has, accommodated within it, a spring-loaded annulus 6 - in the interests of clarity, the quite conventional helical compression spring is not shown - which is displaceable by the muzzle of a co-acting, automatic cut-off receiver, yet to be

described. When the nozzle is in an inoperative condition, or mode, annulus 6 surrounds a fixed discoid member 7 which is rigidly mounted upon a stem member 8 which is held in position in housing 2 via a three-limbed, or "triskellion" spider member 9.

Figure 2 shows, also a vertical cross-section, a co-acting, automatic shut-off - or cut off - receiver in the inoperative, or closed, or relaxed, condition.

The receiver is comprised of a cylindrical housing 9A, a tailpiece 10 which is adapted to be mounted in a sidewall of such as a sump, tank, or other appropriate container - ideally quite close to the bottom thereof.

Housing 9A accommodates a valve body 11, closely dimensioned to fit the opening, or mouth, of the muzzle end 12 of housing 9A. Valve body 11 has a co-axial valve stem 13 adapted to be reciprocally received within a tubular element 14 which is held rigidly in position in housing 9A via a three-limbed, or "triskellion", spider member 15. Valve body 11 is spring-biassed by a conventional helical compression spring (not shown) so as to return it to the "shut-off" position shown in Figure 2, when in the inoperative, or relaxed, condition.

Turning finally to Figure 3, there is to be seen the filling nozzle and co-acting, automatic cut-off receiver of Figures 1 and 2, when they are in their "mated", open, or operative mode.

When the filling nozzle is pushed matingly onto the co-acting receiver, as far as it will go, ball-bearings 5 "ride over" a circumferential, or annular, bead 16 provided on the outer wall of housing 9A, upstream of a circumferential groove 17, into which groove the ball-bearings 5 "click". When this has been accomplished, muzzle end 12 of housing 9A has pushed displaceable, spring-loaded annulus 6 back into nozzle housing 2 while fixed discoid member 7 has simultaneously pushed valve body 11 back against its compression spring, thus providing a passage 18 which communicates the fluid delivery conduit, or

flexible hose, with the interior of the sump, tank or other container in which the co-acting, automatic cut-off receiver has been installed.

When the required, or desired, amount of fluid, oil, or the like has been delivered, the axially movable, spring-loaded annular sleeve 3 is manually moved back, in the direction of arrows A, so that ball-bearings 5 "ride up" over circumferential bead 16 to break the connection between the nozzle and the co-acting receiver. Thus, with a very minimum of delay, a line-up of vehicles can be rapidly serviced.

From the abovegoing, it will be readily appreciated by those skilled in the art that numerous variations and modifications may be made to the invention without departing from the spirit and scope thereof as set out in the following claims.

CLAIMS

1. In combination, a filling nozzle and a co-acting, automatic cut-off receiver; said filling nozzle having, concentrically accommodated therewithin, a spring-loaded annulus axially displaceable, in an upstream direction, by a muzzle portion of said automatic cut-off receiver;

said automatic cut-off receiver having, concentrically accommodated therewithin, a spring-loaded valve body adapted to be axially displaced, in a downstream direction, by a discoid member fixedly mounted with respect to a housing of said filling nozzle, said fixed discoid member being sealingly located, when the said combination is in an inoperative condition, in the centre of said axially displaceable spring-loaded annulus;

whereby, when the said combination is in an operative condition with said discoid member no longer located in the centre of the now-displaced annulus, a passage is defined to thereby communicate a fluid delivery conduit attached to a tailpiece of said filling nozzle with the interior of a fluid container in which the said co-acting, automatic cut-off receiver is installed.

2. The combination as claimed in Claim 1, wherein the said housing is cylindrical and is surrounded by an axially movable, spring-loaded, co-axial annular sleeve, a downstream portion of which is adapted to surround a plurality of radially spaced-apart ball-bearings located adjacent the free end of said filling nozzle housing when said sleeve is in a relaxed mode, the receiver being provided with a circumferential groove in its outer wall in which said ball-bearings are able to engage when the said combination is in said operative condition; whereby said filling nozzle is able to be lockingly held in said co-acting, automatic cut-off receiver while said container is being filled but whereby, when filling has been accomplished, said sleeve is able to be manually moved in an

upstream direction, against a helical compression spring, to thereby free said ball-bearings from the said circumferential groove so that the said filling nozzle can be removed from the said automatic cut-off receiver.

3. The combination as claimed in Claim 1 or Claim 2, wherein said valve body has a co-axial valve stem adapted to be received within a tubular element which is held rigidly in position in said automatic cut-off receiver by means of a three-limbed spider member.

4. The combination as claimed in Claim 1 or Claim 2, wherein said discoid member is rigidly mounted upon a stem member which is held rigidly in position in said filling nozzle by means of a three limbed spider member.

5. The combination as claimed in Claim 2, wherein, when filling has been accomplished and said annular sleeve manually moved in the upstream direction, the said ball-bearings are caused to ride up over a circumferential bead provided on the said outer wall upstream of the said circumferential groove, to thereby break connection between said filling nozzle and said co-acting, automatic cut-off receiver.

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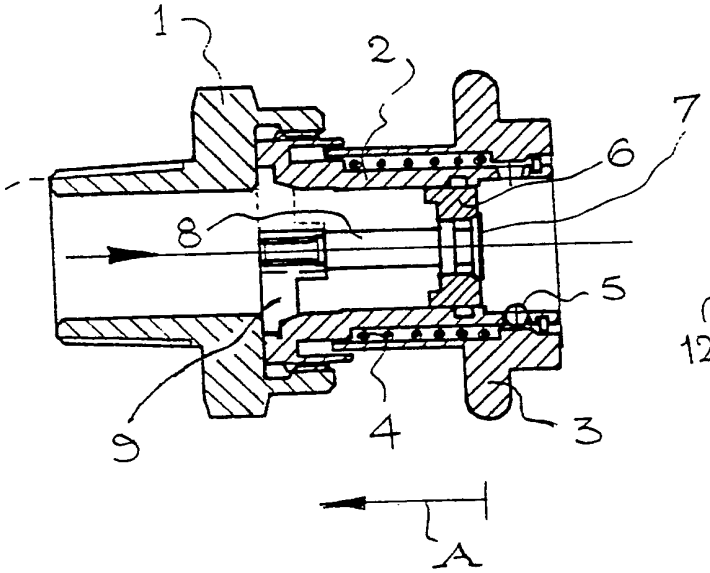
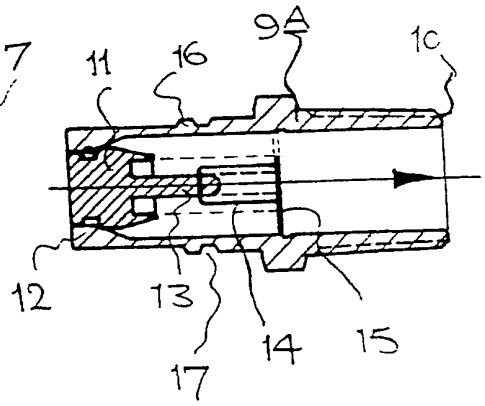
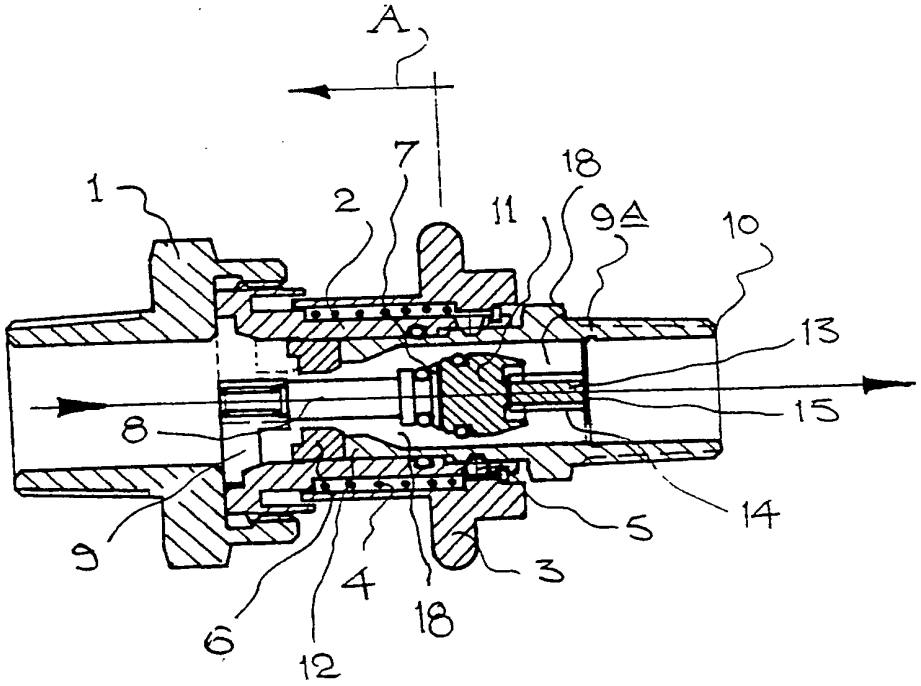


-FIG. 1-



-FIG. 2-



-FIG. 3-

INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 90/00254

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) 6

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl.[5] F16L 37/34

II. FIELDS SEARCHED

Minimum Documentation Searched 7

Classification System	Classification Symbols
IPC	F16L 37/28, 37/34

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8

AU: IPC as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT 9

Category*	Citation of Document,[11] with indication,[12] where appropriate, of the relevant passages	Relevant to Claim No 13
X,Y	AU,B, 66733/81 (534776) (EKMAN) 6 August 1981 (06.08.81)	1-5
X,Y	DE,A, 3406211 (AEROQUIP GmbH) 29 August 1985 (29.08.85)	1-5
X,Y	US,A, 4086939 (WILCOX) 2 May 1978 (02.05.78)	1-5
X,Y	FR,A, 1577931 (REYROLLE HYDRAULICS LTD) 8 August 1969 (08.08.69)	1-5
X,Y	GB,A, 979821 (SOCIETE DU CARBURATEUR ZENITH) 6 January 1965 (06.01.65)	1-5
X,Y	US,A, 3334659 (MAGORIEN) 8 August 1967 (08.08.67)	1-5
X,Y	FR,A, 1266400 (JOSEPH LUCAS (INDUSTRIES) LTD) 10 November 1961 (10.11.61)	1-5
X,Y	GB,A, 2087019 (ARGUS VERWALTUNGSGESELLSCHAFT mbH) 19 May 1982 (19.05.82)	1-5
X,Y	US,A, 3918492 (KARCHER) 11 November 1975 (11.11.75)	1-5

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
11 September 1990 (11.09.90)	19 September 1990
International Searching Authority	Signature of Authorized Officer
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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL APPLICATION NO. PCT/AU 90/00254

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report	Patent Family Members					
AU 66733/81	CA	1141798	DE	3101079	FI	803927
	FR	2474640	GB	2068069	JP	57040196
	SE	8000716	GB	2068069		
GB 2087019	DE	3041909	FR	2493468	GB	2087019
	IT	1171350	US	4429713		

END OF ANNEX